1946

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RIALS NEEDED FOR MAKING PLASTIC SOCKETS

A. For taking a Wrapped Plaster Cast.

1. Plaster bandages 4" by 5 yds.

   These can be made up from Crinoline (purchased from a local surgical supply house) and plaster. At a greater material expense, prepared orthopedic plaster bandages can be bought at the same surgical supply house.

2. Stockinette 3" and 4" in 25 yd rolls.

   Local surgical supply house. The stump is covered before the bandage is wrapped.

3. Felt, white wool, 1/4", 3/8", or 1/2".

   It can be split to any desired thickness merely by pulling the layers apart.

   Felt is used for covering bony prominences on a BK stump before taking the cast. Small quantities can be bought from any local surgical supply house. For greater quantity:

   Felt style #902, 3/16" up to 1/2"

   The Standard Felt Company
   29 South Palm Avenue
   Alhambra, California

4. Cardboard.

   A smooth cardboard, similar to that in a file folder, is the proper weight for holding a 1" thickness felt extension to the end of a BK Stump. This cardboard is rolled into a snug fitting tube which is fastened with paste or adhesive to the end of the stump with the circular pad inside. This produces a replica longer than the stump but with the same taper.

5. Paste.

   Any office paste that is water soluble (like Le Page's). Used for sticking the felt and cardboard extension collar to the stump.

6. Indelible pencil.

   For marking circumference levels on the stump, and lines on the plaster cast.

7. Quick setting dental or orthopedic plaster of Paris.

   Plaster should set in 9 to 12 minutes. Can be obtained at a local surgical or building supply house. A small quantity of a liquid mixture can be rubbed into the stockinette before wrapping the bandage. The same plas-

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ter is used to fill the cast to obtain a stump replica.

Suggested reading: "Orthopedic Appliances" by Henry Jordon, M.D., Chapter II, Plaster of Paris Technique, for general information concerning wrapped casts.

B. For Preparing the Plaster Replica.

1. Several tapered wood spindles in 12" lengths of various diameters, 2-1/2" - 3" on one end, and 1-1/2" - 2" on the other.

   It would be good to have 6", 1/2" diameter shafts extending from the large ends to serve as a means of holding them in a vise. They probably must be made in the shop.

2. Screen wire, close mesh.

   Common screen wire, cut into sections about 3" or 4" x 6" or 8" with binding tape sewed around the edges, makes an excellent smoothing agent for plaster.

3. Long blade knife, with rounded end.

   Ideal for modeling the plaster model, cutting out ridges and trimming.

4. Draw knife, small.

   Helpful in trimming large casts as of an AK or BK stump.

5. Fine sandpaper.

   After the model is dry, finer smoothing can be accomplished with sandpaper. (This will not be necessary if the damp model is first polished with a strip of gauze.)

6. A solution of cellulose acetate in acetone for painting the model. This provides a clean model and helps prevent moisture from escaping outward toward the plastic. Scrap cellulose acetate sheeting, purchased from local button and badge company, dissolved in acetone is adequate. Cleaned X-ray film is just as good. Airplane dope is a comparable product sold at some paint stores or at an aircraft supply house as:

   Pyroxylin Products, Inc.
   Aircraft Dopes and Lacquers
   4851 South St. Louis Avenue
   Chicago, Illinois

   When the model is absolutely dry, the above step is not needed.

7. A parting lacquer.

"Hi-Glow" Plastic Parting Lacquer
Western States Lacquer Company
4400 East Washington Blvd.
Maywood, California

Northrop is painting this over the model and finds it quite suitable as a separator between the plaster and plastic. Two or three coats work the best.

8. A parting material.

Resistoflex Corporation
Belleville, 9, New York

Resistoflex sheeting .003 in thickness.

Cemented or heat-sealed into tapered tubes and moistened in a damp towel for fifteen minutes, this material will soften and stretch over any desired shape of model. It has a glass smooth surface and is an ideal separator. It was used at Bushnell in preference to the parting Lacquer because the sleeve could be extended beyond the model, thus covering the spindle and protecting it from the plastic. Unlike most plastics, Resistoflex (P.V.A. - polyvinyl alcohol) hardens when heated up to a certain degree. In any case, P.V.A. is needed to cover wrapped plastic.

9. Liquid P.V.A.

"Elvanol" Polyvinyl Alcohol.

Medium Viscosity type B
Grade 71-A-24

E. I. DuPont De Nemours & Co.
Electrochemical Department
Niagara Falls, New York.

This material is a powder which is mixed with water and thoroughly dissolved. (Solution must be continually stirred for an hour while heated to 175° - 200° F.) When painted on a model, it gives the same protection as P.V.A. or Resistoflex sheeting provides. It is a good sealer for cementing the P.V.A. tubes (mentioned in paragraph B). At Percy Jones General Hospital, the practice is to give the plaster model a cellulose acetate undercoat before painting it with the above solution. The solution should have a low viscosity.

C. For Mounting the Plaster Replica.

Mounting or holding the replica while the plastic and cloth is applied can be accomplished in numerous ways. The simp-

lest method, but not the cleanest, was employed at McClosky General Hospital. There the replica was centered and driven between extra large lathe centers.

At Bushnell the replica was first mounted over an independent mandrel which could be covered completely with the Resistoflex. This mandrel was a perforated 5/8" I.D. tubing, having two large tapered cores on it that would fit the ends of any hollow cast. Thus mounted, the assembly could be placed on a driving spindle. A simplified version was found at England General Hospital where a long, tapered core inserted into the cast was pushed on a driving spindle. Basically, all that is needed is some means of holding a hollow replica along its longitudinal axis and revolving it, about six inches above a tray of the plastic resin while the fabric and resin are applied.

D. Materials that go into the plastic socket.

1. Plastic Resins.

Bakelite BRS 16631

Bakelite Corporation
30th East and 42nd Street
New York 4, New York

This resin has equivalent in other manufacturers' products: Northrop has been using laminac #4116 by American Cyanamid Corporation; the Selectron 5000 Resins series by Pittsburgh Plate Glass Company are described in their technical report revised February 1, 1946. It contains much practical and informative data and can be obtained by writing to their offices in the Grant Building, Pittsburgh 19, Pennsylvania.

2. Catalysts.

To effect proper curing of the above plastic resins a peroxide catalyst must be added. There are several products on the market suitable for this purpose. At Bushnell General Hospital the following was used:

Alperox C or Lucidol Benzoyl Peroxide

Lucidol Corporation
1740 Military Road
Buffalo, New York

As only .05% by weight of catalyst is required, only a small quantity need be purshased. Also, since the catalyst is a peroxide and unstable, the storage life is not very long.

3. Fabric

a. 1" roller gauze

It might be more economical to buy 2", 4", or 5" roller surgical ganze, 5 yd. length, and cut it to 1" width than to purchase 1" rolls. Most drug stores handle this item.

b. Collar on BK socket.

If the socket is for a BK stump a collar must be included, and it is helpful to indicate its thickness or depth. The original practice was to wrap one layer of red flannel around the upper portion of the socket before continuing the wrapping to form the collar. However, at Lawson General Hospital, a colored gauze was substituted for the white gauze and red flannel, and the results were favorable.

c. If a socket of uniform thickness throughout is desired, as with an arm socket, stockinette is indicated. For most requirements the 3" width would be sufficient. However, when using stockinette there is no winding operation.

E. Miscellaneous.

1. A cleaning agent for the plastic resin is acetone or methyl ethyl ketone, the latter being less offensive over long periods of use.

2. An oven with a range up to 350° F is needed to cure the socket. The type used at Bushnell was a simple electric coil hot air sterilizer with inside space about 24" x 48" by 20".

3. The winding machine, which should be made to receive the type of mandrel chosen to hold the models, has simple requirements. If possible, the spindle speed should be controllable between 50 and 100 r.p.m. Several types are in use with various spindle speeds, As the operator becomes more experienced, the winding speed can be increased. Also, certain types of stumps, as a BK, can be wound faster than a Symes or an AK. A foot operated brake should be supplied. Some machines have a brake system which stops the spindle whenever the foot is removed, others are arranged in the reverse manner.

Carlton Fillauer
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